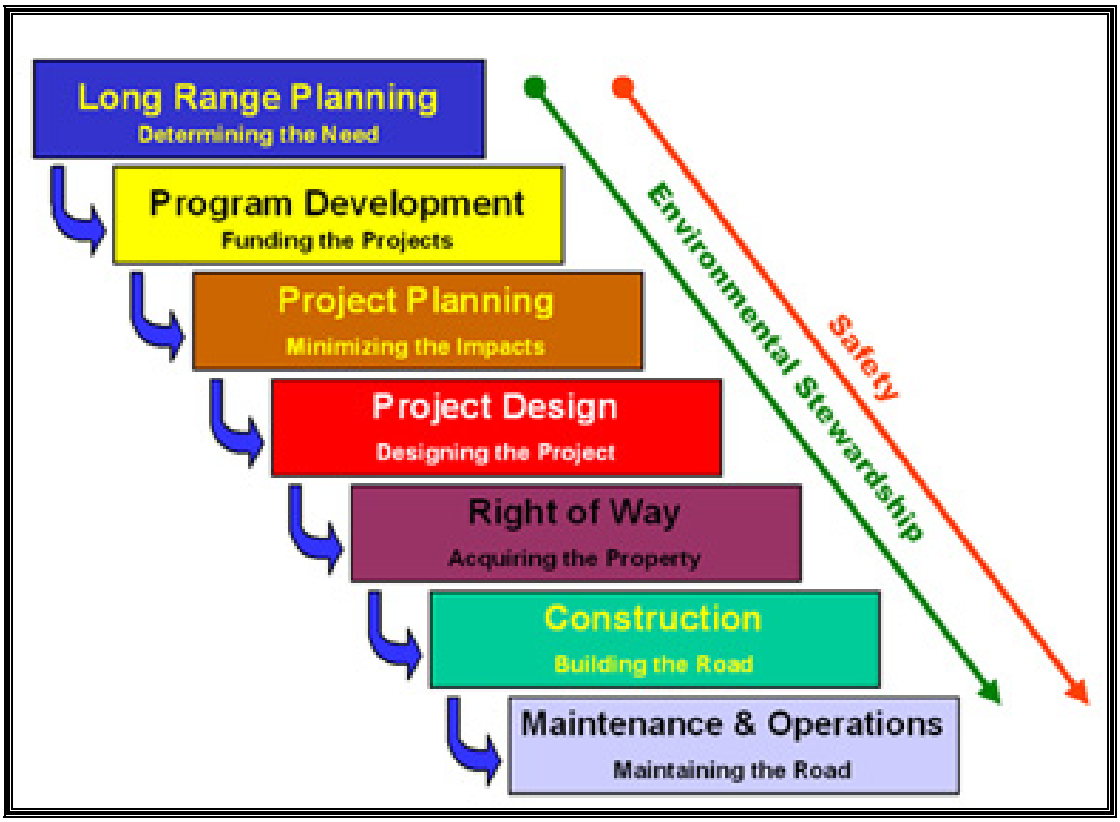
Workstream:

TIP Program

T.I.P Delivery Improvement
Final Report



Report Prepared by:

T.I.P. Project Delivery Improvement Team

Charter of Work Stream

The T.I.P. Project Delivery Improvement Team was formed to examine the current T.I.P Project Delivery process and provide recommendations for project delivery improvement to the Transformation Leadership Team for their consideration. This document outlines the findings and recommendations of the T.I.P. Project Delivery Improvement Team Initiative. The content of this report details the approach utilized in reviewing current management processes and status of T.I.P. delivery, results of workshops held with process stakeholders, a review of findings from the research and data reviewed and the recommendations to improve project delivery and accountability at NCDOT.

Mission

In late September 2007, the T.I.P. Project Delivery Improvement Team was tasked with looking at the current T.I.P project delivery process to develop recommendations for improvement. The Team formulated the mission statement as follows:

"Enhance NCDOT's ability to deliver projects of statewide significance within defined metrics of scope, schedule and budget through:

- *Identification of a "pilot" group of projects that are deemed to be significant*
- *Communication of pilot projects priorities to staff*
- *Identification of management models to guide the pilot projects through the Preconstruction and Construction process*
- *Monitor and publish metrics of project delivery relative to scope, schedule and budget."*

Background

The T.I.P has over 2,040 funded projects. With the amount of projects in the T.I.P competing for DOT resources and our partner resources and limited priorities defined, delivery success has been sporadic with limited schedule certainty.

All funded projects in the T.I.P currently share the same level of importance. Project priorities change frequently and are not "explicit" from the 14 divisions. Staff has a tremendous task of delivering all 2,040 funded T.I.P. projects on schedule.

There are repeating consequences when you have a lack of clearly defined project priorities; Lack of clarity to staff on the completion of competing work assignments, Lack of staff ability to prioritize work, Staff "fighting fires" on multiple projects, Schedule delays, Scope and Budget Creep, communication problems and Projects with statewide significance and high return on investment that are not identified or prioritized to elevate their importance of delivery.

Current Performance

There are several major areas that are key indicators in measuring a DOT's effectiveness and efficiency and have a major impact on the DOT's customers: 1) Time Schedule for Project conception to construction advertisement; 2)management of total project planning and design cost: 3)construction inspection/engineering cost management; and 4) management of construction cost overruns. Project delivery data was gathered for all projects to take a snapshot of delivery performance over the past several years. (see figure 1 below)

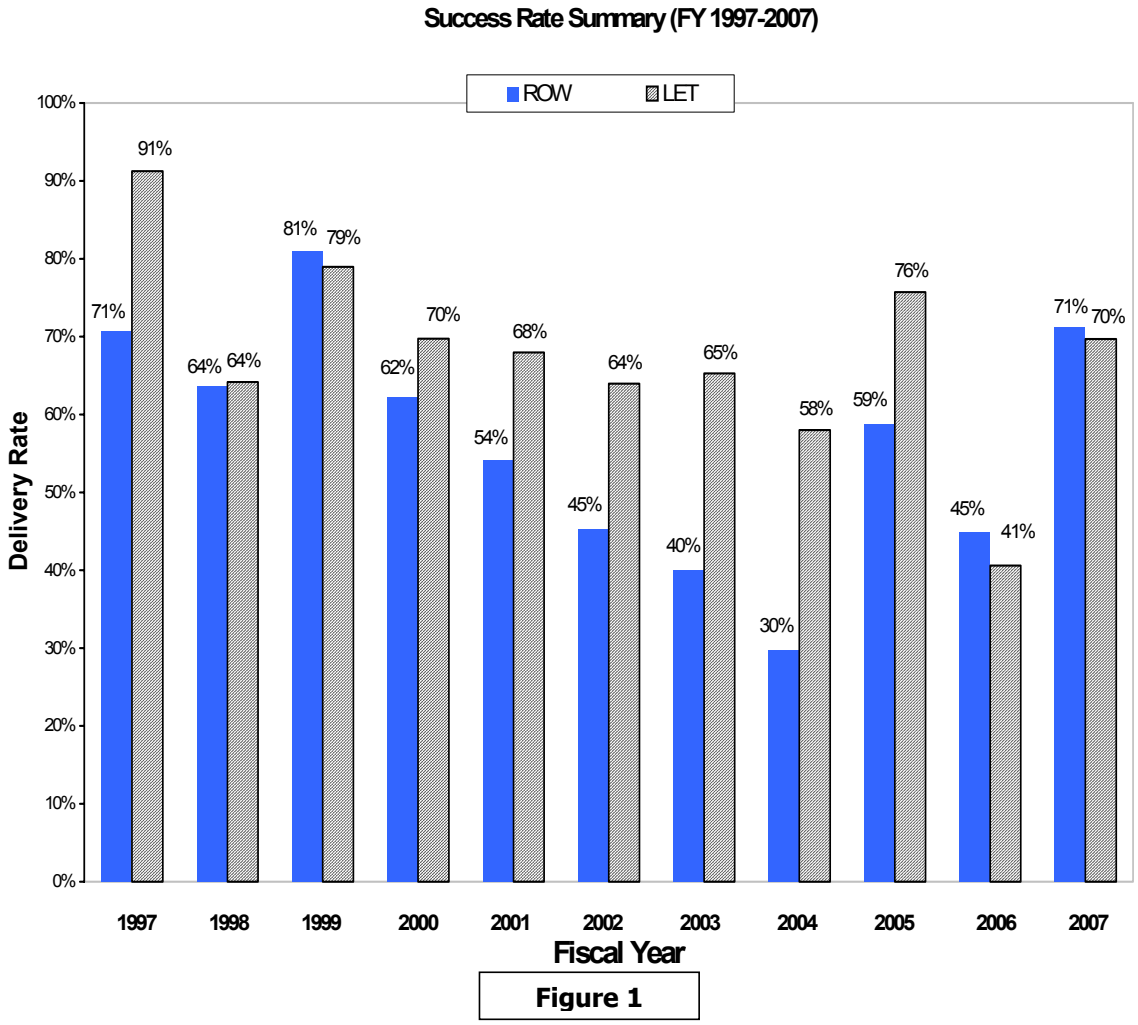


Figure 1

Currently there is not a defined budget for T.I.P planning and design activities. Approximately 15% of total project construction cost is established to pay for construction engineering and inspection work, and all stakeholders stated that estimated ROW and Construction cost are systemically too low. There are several influencing factors that are major contributors to

increases in costs: scope changes, dramatic increases in construction cost, environmental impact mitigation and the fiscal consequences of the delay in project schedules.

StaRS provides project information but is not currently utilized as an effective tracking tool for scope, schedule and budget on projects. StaRs also presently allows a project to be re-baselined relative to schedule with no historical record of changes. The system is currently very labor intensive and still requires manual manipulation of data. The current procedure for schedule changes needs more documentation and transparency as a process.

Responsibility for project delivery is distributed across multiple organizational units. With the exception of PD&EA, who has regionalized, the assignment of design responsibility varies, with one Roadway engineer working with four to five different Divisions and numerous other design disciplines based on workload distribution. Business units tend to be siloed, passing off their product one to another with no united vision or goal for the overall process. This focus on task oriented work has ultimately narrowed our vision relative to project delivery and is not conductive to meet performance metrics. There is no common thread throughout the entire project delivery process.

Currently there is an initiative underway to secure a Transportation Decision Support System. There is not a mechanism or system in place to store and transfer a substantial amount of information from long range transportation planning to project planning to other interested business units. Other peer states are utilizing similar systems to streamline the electronic transfer of information between State DOT's to Federal environment agencies and State environmental agencies allowing a process time savings. Efforts such as this should be part of a continual process improvement initiative that should continue as we try to improve project delivery success.

The development of a Project to the point of Letting, or the development of a set of biddable, buildable plans is one of NCDOT’s key “Products”. While we recognize the need for our organization to be flexible, responsive and respectful of transportation needs across multiple modes, we need to strive to become a "Proactive" organization and find a method to eliminate processes that define a "reactive" environment and organization.

The expression "Time is Money" is especially true for designing and constructing transportation projects. The greatest factor in reducing cost for projects is reducing the delivery time.

Methodology

To examine the current T.I.P Project Delivery Process consultations were held with a large cross-section of internal and external stakeholders including:

- ⇒ NCDOT Design Engineers, Planners and Division Personnel
- ⇒ Private Engineering Firms
- ⇒ Division Engineers
- ⇒ Division and Central Right of Way staff
- ⇒ Right of Way Utility Staff
- ⇒ Area Bridge and Area Roadway Engineers
- ⇒ T.I.P Development Staff
- ⇒ FHWA Staff

In addition to consultations with internal and external stakeholders, an in depth study of the previous 2004 Dye Management Report and the PBS&J Project Delivery Report prepared for the North Carolina General Assembly were performed. The Team also reviewed "best" project delivery practices from several peer State DOT's.

The team brainstormed to identify management models to be utilized on a select group of high priority, strategic projects identified at the September 10th prioritization summit and confirmed with BOT members, Division Engineers, Design Staff and the TMT Leadership Team. The Team assigned the selected strategic projects to specific delivery models based on the maturity of the project in its development. The team brainstormed action plans for implementing the identified "Proof of Concept" models. The team established scope, schedule, budget and quality metrics for each project.

Summary of Diagnostic Findings by the T.I.P Project Delivery Improvement Team

The following functionality issues were identified from consultations with external and internal stakeholders:

- Random and lack of defined priorities within DOT and regulatory agencies
- No common thread of responsibility across all delivery phases
- Stars efficiency- Currently Labor intensive and under utilized
- Regionalization of Production Units
- Project Documentation/Communication
- Project Scoping Early Involvement/Scope Creep
- Project Management
- Streamline Merger 01 process
- TIP Estimated ROW/Construction Cost systemically too low
- Time to contract PEF's
- Peer reviews of major projects at strategic intervals
- Value Engineering and Constructability reviews earlier in the process and utilized extensively as a business practice
- Identify big Cost/Road block issues early
- Streamline Traffic forecasting and integration into the project

- Earlier involvement for Traffic Control and Utilities
- Strategic Lettings/Early contractor involvement

All of the identified issues are consistent with the four functionality problems identified in the McKinsey diagnostic. The four functionality problems identified were:
1) Coordination among business units
2) Project accountability
3) Coordination across geographic regions
4) Bureaucracy

A comprehensive review of several state DOT's "Best Delivery Practices" was performed. The following is a compilation of these practices from several peer State DOT's:

- **Missouri DOT** uses a concept called "Practical Design" (no more, no less). It encourages staff to challenge established design standards, fitting solutions to circumstances and revisiting projects slated for construction to rethink application of costly criteria to project design. "In just its first two years, Practical Design saved Missouri taxpayers $400 million" *Appendix A*

- **Ohio DOT** Project Development Process (PDP) supports regular communication among technical disciplines, which results in quality plans and minimizes cost overruns during right of way acquisition and project construction. Transportation Projects are classified as minimal, minor or major based on project size, complexity and or potential impact to the environment. The PDP encourages communication among disciplines, requires documentation to support project related decisions, eliminates duplicative efforts among disciplines, provides early identification of red flag issues and ensure that work products are completed as early in the process as possible. *Appendix B*

- **Minnesota DOT** has a "distributed product/service delivery organization: offices in this type of organization typically have one of three roles: corporate, expert or production. Corporate determines direction, resources and where accountability lies then distributes responsibility to the districts and offices to deliver the program. One of MnDOT's four strategic objectives is to "streamline the delivery process while improving quality and cost effectiveness". The goal of streamlining is to deliver more work without a corresponding increase in resources by doing "less" or fewer process steps. Their efforts resulted in over 40 project delivery streamlining initiatives. *Appendix C*

- **Florida DOT** has invested heavily in creating one year and three year work plans as a means to direct work efforts, to evaluate performance on an individual and group basis and to report outcomes. *Appendix D*

- **Washington State DOT** has designed a Project Management academy for training of all Project Managers. The Secretary of Transportation issued an Executive Order that directs all capital transportation projects are to be delivered consistent with the principles and practices of the department's project management process. WSDOT created the Project Control and Reporting Office which monitors, tracks and reports the delivery of their Capital Program. They are committed to managing and delivering each project funded by the legislature as scoped, on time and within budget. WSDOT also has an early coordination

process with Resource agencies call "MAP". The MAP Team includes five agencies that meet regularly, with one primary goal – to provide permit services for a selected set of projects. *Appendix E*

- **Virginia DOT** has a very effective value engineering program. They also have an on-line dashboard to provide project status reports on a need to know basis. The display allows authorized parties to "drill down" into the available database that supports the dashboard and find key information vital to maintaining control of individual projects. *Appendix F*

- **South Carolina DOT** has developed two leadership development programs. The Strategic Training for Transportation Agency Representatives (STTAR) is a yearlong course for agency employees who exhibit potential for promotion to senior leadership positions in the agency. STEP-21 (Strategic Training and Education Program for the 21st Century) has been developed for selected employees who show outstanding potential for mid-level managerial positions. SCDOT has also developed a dynamic four-day course – "Leadership Development for Supervisiors." All managers and supervisors are required to take this course. SCDOT publishes the Accountability Report which is used as an indicator for various performance measures. The report is made available to all employees and is also posted on the agency's website. *Appendix G*

- **Tennessee DOT** has a Program Development/Project Management Division. TDOT's project managers are identified and assigned to a project prior to project scope preparation. The Project Manager is the driver for the project, they must have knowledge of scheduling, the overall project development process, individual functional area processes, and skills in project management and team building. *Appendix H*

A review of the 2004 DYE Management Report to the North Carolina Legislature was performed to assess the project management maturity of NCDOT according to the Project Management principles established by the OPM3 model. The model measures an organizations project management maturity on a number of factors, including among others:

- Extent of integration of project activities.
- Effectiveness of scope management.
- Effectiveness of time management.
- Extent of cost management.
- Implementation of Quality and Risk Management programs.
- Utilization of a structured project communications program.
- Extent of integration of vendors or suppliers into an organization's project management processes.

The report provided its assessment on a scale developed by Project Management Solutions, Inc. This scale is an adaptation of the Project Management Institute's OPM3 maturity model and components of the Project Management Institute's PMBOK model of project management knowledge. The analysis of project management maturity as part of this effort, yielded the following assessment:

Exhibit V-1: Assessment of NCDOT Project Management Maturity

Level of Project Management Maturity	Level 1: Initial Process	Level 2: Structured Process and Standards	Level 3: Organization of Standards and Institutionalized Process	Level 4: Managed Process	Level 5: Optimized Process	Current NCDOT Maturity Level
Integration Management	No established practices, standards, or Project Office. Work performed in ad hoc fashion.	Basic documented processes. Management only involved on high visibility projects.	Project integration efforts institutionalized with procedures and standards. Program Office established.	Processes/standards utilized by all projects and integrated with Department systems. Decisions based on performance metrics.	Project integration improvement procedures utilized. Lessons learned regularly examined and used to improve documented processes.	**Level 1.** Since no documented Project Development Manual, no Program Office driving coordination of initiatives, etc.
Scope Management	General statement of requirements. Little/no scope management or documentation. Management aware of key milestones only.	Basic scope management process in place. Scope management techniques regularly applied on larger, more visible projects.	Full project management process documented and utilized by most projects. Stakeholder actively participating in scope decisions.	Project management processes used on all projects. Projects managed and evaluated in light of other projects.	Effectiveness and efficiency metrics drive project scope decisions by appropriate levels of management. Focus on high utilization of value.	**Level 1 or 2.** There is no documented scope management process and little scope management except potentially on some higher visibility projects.

Level of Project Management Maturity	Level 1: Initial Process	Level 2: Structured Process and Standards	Level 3: Organization of Standards and Institutionalized Process	Level 4: Managed Process	Level 5: Optimized Process	Current NCDOT Maturity Level
Time Management	No established planning or scheduling standards. Lack of documentation makes it difficult to achieve repeatable project success.	Basic processes exist but not required for planning and scheduling. Standard scheduling approaches utilized for large, visible projects.	Time management processes documented and utilized by most projects. Organization wide integration includes inter-project dependencies.	Time management utilizes historical data to forecast future performance. Management decisions based on efficiency and effectiveness metrics.	Improvement procedures utilized for all time management processes. Lessons learned are examined and used to improve documented processes.	**Level 1 or 2**. NCDOT has developed time metrics for each project type as part of PMii implementation. No process yet for effectively managing against these metrics and for ongoing update and adjustment to metrics based on lessons learned.
Cost Management	No established cost practices or standards. Cost process documentation is ad hoc and individual project teams follow informal practices.	Processes exist for cost estimating, reporting and performance. Cost management processes are used for large, visible projects.	Cost processes are organizational standard and are utilized by most projects. Costs are fully integrated into Program Office function.	Cost planning and tracking integrated into Program Office and tied to financial and HR systems.	Lessons learned improve documented processes. Management actively uses efficiency and effectiveness metrics for decision-making.	**Level 1.** Limited cost practices or standards. Projects are not managed to budget, especially during Project Development and Preconstruction phases

Level of Project Management Maturity	Level 1: Initial Process	Level 2: Structured Process and Standards	Level 3: Organization of Standards and Institutionalized Process	Level 4: Managed Process	Level 5: Optimized Process	Current NCDOT Maturity Level
Quality Management	No established project quality practices or standards. Management is considering how they should define "quality."	Basic organizational project quality policy has been adopted. Management encourages quality policy application on large, visible projects.	Quality process is well documented and an organizational standard. Senior management involved in quality oversight for most projects.	All projects required to use quality planning standard processes. The Program Office coordinates quality standards and assurance.	The quality process includes guidelines for feeding improvements back into the process. Metrics are key to product quality decisions.	**Level 1.** NCDOT has no defined quality standards or formalized project level quality assurance process.
Human Resource Management	No repeatable process applied to planning and staffing projects. Project teams are ad hoc. Human resource time and cost is not measured.	Repeatable process in place that defines how to plan and manage human resources. Resource tracking for highly visible projects only.	Most projects follow established resource management process. Professional development program establishes project management career path.	Resource forecasts used for project planning and prioritization. Project team performance measured and integrated with career development.	Process engages teams to document project lessons learned. Improvements are incorporated into human resources management process.	**Level 1.** Project staffing is currently ad hoc.
Communications Management	Ad hoc communication process in place whereby projects are expected to provide informal status to management.	Basic process is established. Large, highly visible projects follow the process and provide progress reporting.	Active involvement by management for project performance reviews. Most projects are executing a formal project communications plan.	Communications management plan is required for all projects. Communications plans are integrated into corporate communications structure.	An improvement process is in place to continuously improve project communications management. Lessons learned are captured and incorporated.	**Level 1 primarily, with some characteristics of Level 2.**

Level of Project Management Maturity	Level 1: Initial Process	Level 2: Structured Process and Standards	Level 3: Organization of Standards and Institutionalized Process	Level 4: Managed Process	Level 5: Optimized Process	Current NCDOT Maturity Level
Risk Management	No established practices or standards in place. Documentation is minimal and results are not shared. Risk response is reactive.	Processes are documented and utilized for large projects. Management consistently involved with risks on large, visible projects.	Risk management processes are utilized for most projects. Metrics are used to support risk decisions at the project and program levels.	Management is actively engaged in organization-wide risk management. Risk systems are fully integrated with time, cost and resource systems.	Improvement processes are utilized to ensure projects are continually measured and managed against value-based performance metrics.	**Level 1.** NCDOT has no documented risk management process and risk reviews are not regularly conducted, even on large, visible projects.
Project Procurement/Vendor Management	No project procurement process in place. Methods are ad hoc. Contracts managed at a final delivery level.	Basic processes documented for procurement of services. Procurement process mostly utilized by large or highly visible projects.	Process an organizational standard and used by most projects. Project team and Purchasing unit integrated in the procurement process.	Make/buy decisions are made with an organizational perspective. Vendor is integrated into the organization's project management mechanisms.	Procurement process reviewed periodically. On-going process improvements focus on procurement efficiency and effectiveness metrics.	**Level 2 to Level 3.** Standardized processes, with significant opportunity for improving effectiveness of these processes.

Recommendations by T.I.P Project Delivery Team

NCDOT's key to Project Delivery within defined metrics of scope, schedule, budget and quality is achievable when all business units work towards a common goal, being measured by common performance metrics. Based on the aforementioned information and data gathering efforts the team offers the following information relative to project delivery efforts within NCDOT.

Recommendations	**Why**
Recommendation 1☐ Implement Pilot Management models ☐ Train the Planners, Designers and Construction engineers and Project Executives involved in the pilots in Team based Project Management, cost estimating (Design and Construction), life cycle costing, innovative construction practices and material selection. ☐ Train in and analyze for each pilot the use of innovative contracting practices for faster and more cost efficient construction.	Formalizes project teams, and defines team leader accountability, applies formal management process, establishes transparent and reported metrics Enhance and build skill sets of key project personnel in the listed subjects to tighten cost and schedule parameters and enhance delivery Construction delivery of projects using other techniques could save time and money. Less delay to public, better and faster delivery for NCDOT
Recommendation 2☐ Establish process where Divisions can partner with Preconstruction on development of T.I.P. Project that require PCE or CE	Increase speed and efficiency. To enhance project delivery accountability. Spread workload over more resources.
Recommendation 3☐ Assign local right of way utility position	This position would coordinate all utility work in each respective Division. This would increase efficiency and introduce accountability. Would also provide the Utility companies with one contact. Would also encourage team building relationships with local utility companies

Recommendations	Why
Recommendation 4☐ Improve communication flow across all organizational units. Designated team concept should facilitate this improvement. Alignment of design personnel with the PD&EA regions and the Divisions also supports work flow and accountability.	Regional alignment of key project personnel would facilitate better team work, build and enhance relationships, facilitate removal of functional walls
Recommendation 5☐ Require the practice of value engineering and constructability reviews for major strategic projects and ultimately all major projects at appropriate project development stages.	Saves cost and potentially schedule time in project delivery, facilitates teamwork and cross-training of technical skill sets. Implement Value Engineering Report Recommendations
Recommendation 6☐ Hire a professional facilitator to conduct Merger Team Meetings.	Project Executive and Project Managers need to only focus on their participator role in the meeting.
Recommendation 7☐ Establish an office of Program/Project Delivery to own the overall Policy, Procedures, Standards and other support mechanisms. This office will be staffed with Regional Project Delivery Executives. The Project Executives will oversee multiple projects. As with many project management offices, they will work with the functional areas to accomplish the project development of individual projects. The Project Executives will have the support of upper management when issues arise, and manage more by influence than authority. (Loose matrix) This proposed Office of Program/Project Delivery will house project services and a fully functional consultant procurement function. This office will serve as a bridge between Operations and Preconstruction.	Standardizes policies, procedures and communication for all stages of project development across departmental boundaries. Ties together the delivery team and drives the project to completion. Reinforces and ensures accountability. Streamlines and increases efficiency of consultant procurement review of proposals and managing the administrative and financial details of all contract activities. Scope change management would also be a responsibility

Recommendations	Why
<u>Recommendation 7A</u> ☐ Develop a scope to construction project development manual. This manual should strengthen project management practices by establishing standardized business rules, roles and responsibilities for project delivery. The manual should include all components of project delivery from project inception through construction and focus on establishing standardized business rules for project delivery, roles and responsibilities **<u>Recommendation 7B</u>** ☐ Implement "Regional Information Exchanges" on a monthly basis. The objective of these meetings would be to calibrate operations and preconstruction resources, ideas for project and program delivery and review and monitor success in meeting delivery metrics. Create a Project Delivery Streamlining Committee under TMT Strategic Blueprinting to review and recommend Project Delivery Streamlining initiatives. The seven recommended focus areas for this should include: ☐ Concurrent Processes ☐ Technology Advances ☐ Organizational Changes to improve process ☐ Consultant Process Improvements ☐ Environmental Process Improvements ☐ Right of Way and Right of Way Utilities Process Improvements ☐ Design Process Improvements Project Delivery Streamlining Team will be guided by a TMT Steering Committee who will report to the Leadership Team. Multiple deliverable established between Dec. 1st and July 1, 2008 with conclusion by July 1, 2008. ☐ Charter a Program/Project Delivery Committee at the Senior executive level to provide oversight, provide strategic direction for program and project delivery and monitor accountability of defined metrics.	Enforces accountability and the "NCDOT Way" of Project Delivery. Codifies and establishes business practices for project delivery. Good resource for future engineers and managers Team building, communication, technology/idea exchange, efficiency, sharing of knowledge and resources, accountability Continuous process improvement is a must for any successful organization or business. The objective of this workstream is to analyze, review and then recommend project delivery streamlining initiatives. Expected outcomes would be specific recommendations for less work or rework, fewer handoffs (remove functional walls), reduce reviews and approvals, automation of steps, concurrent work activities, more efficient utilization of consultants, earlier involvement of internal/external stakeholders, innovative contracting methods, utility relocation, etc... Enforces and insures accountability and consistency, establishes priorities, sets performance standards

Recommendations	Why
Recommendation 8 ☐ Create an informal two tier T.I.P. with one part Development and one part Delivery. This would take the form of a three to five year work plan for Preconstruction.	Enhances priorities for work activities for preconstruction and operations, defines metrics for scope, schedule and budget, publishes and makes transparent DOT's project goals
Recommendation 9 ☐ Establish a dedicated job function of Project Management Executive. Train all project executives and managers in: ☐ Project Control and Scheduling ☐ Financial and Budget management, Risk Assessment and Mitigation ☐ Project Communication ☐ Project Team Management ☐ Contract Management ☐ Management of Multiple Projects Establish a Project Management Development Program for NCDOT Project Executives and Project Managers. The Project Executives and Managers must have: ☐ Knowledge of scheduling, the overall project development process ☐ Knowledge of individual functional area processes ☐ Skills in project management and team building ☐ Know the Department's priorities and coordinate with other project executives and managers and resource managers ☐ Know project status relative to schedule and budget, unresolved issues, and next key project steps ☐ The project manager is the driver for the project and coordinates all project team members actions	Enhances communication, collaboration, coordination of management activities on major strategic, high value projects. Stitches together the team concept and provides a "go-to" person for project information and accountability. Enhances project delivery against specified metrics, formalizes training to develop skill sets of key project personnel.

Proof of Concept Project List

TIP Project #	Division	Project Description	Proof of Concept
B-2500	1	Bonner Bridge - bridge #11 over the Oregon Inlet	Project Executive with Formal Team
I-3802	9, 10	NC 73 in Concord to MP near Salisbury	Project Executive with Formal Team
I-3803 B	10	Proposed widening from Speedway Boulevard to NC 73	Project Executive with Formal Team
R-2250	2	Greenville Southwest Bypass	Project Executive with Formal Team
R-2514 B,C,D	2	From north of Jacksonville to south of New Bern	Project Executive with Formal Team
TIP Project #	**Division**	**Project Description**	**Proof of Concept**
I-3819 A	12	I-40/I-77 interchange in Statesville	Tri-Technical Managers
I-5104	5	I-40/I-540 Interchange Improvements	Tri-Technical Managers
R-2633 A,B	3	Wilmington Bypass	Tri-Technical Managers

R-2915	11	From US 421 in Watauga Co. to US 221 Bus/NC 88 in Jefferson in Ashe Co.	Tri-Technical Managers
U-3110	7	Elon College- New route from US 70 to NC 100	Tri-Technical Managers
U-3326B	7	Reidsville	Tri-Technical Managers
TIP Project #	**Division**	**Project Description**	**Proof of Concept**
A-0009B, C	14	US 74 from NC 143 North of Cheoah to NC 28 at Stecoah except tunnels	DOT Project Executive
I-2513	13	Asheville Connector	DOT Project Executive
I-4744	5	From Wade Avenue to I-440/US 64	DOT Project Executive
I-4745	6	Proposed widening	PEF Planning Turn Key Delivery, PEF Design Turn Key Delivery DOT Project Executive with Formal Team

Definition of each Proof of Concept Model

DOT Project Executive: (No Line Authority)

The DOT Project Executive will be assigned to Major strategic projects. The DOT Project Executive will be the main point of contact for project related information. The DOT Project Executive will ensure effective management of project scope, schedule and budget. They will be responsible for recognizing and resolving conflicts, providing solutions to conflicting workload issues, goals and objectives and documenting decisions that impact scope, schedule and budget. The DOT Project Executive will coordinate and obtain concurrence on all aspects of the project from inception to completion. They will aid in identifying available resources.

DOT Project Executive with Formal Team: (Line Authority)

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The DOT Project Executive will be assigned a Formal Team. The formal team will consist of a representative from each technical discipline that is involved in the project development. The DOT Project Executive will be responsible for internal coordination and communication across all disciplines. They will be responsible for managing the Team so all milestones can be achieved on schedule and on budget.

The formal team will consist of a core team and an extended team.
The core team members will be the following:

- Roadway Project Engineer
- Planning Project Engineer
- Division Construction Engineer
- Division Right of Way Agent
- Hydraulic Project Engineer
- Utility Coordinator
- NEU Permit Specialist
- HEU Public Involvement

The core team for each project will identify the extended team. The extended team will consist of team members from other disciplines who have work activities to complete to advance the project. The DOT Project Executive will formally notify the extended members that they are on the formal team and ask them to attend team meetings as necessary.

Tri-Technical Managers:

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Tri-Technical Managers model will consist of a Roadway Project Engineer, Planning Project Engineer and Division Construction Engineer who will be jointly responsible for scope, schedule and budget. This will become the Standard Operating Practice for all projects. The Tri-Technical Managers will collaborate and communicate on all aspects of the project from inception to completion. The will be responsible for jointly managing the project to obtain all milestones on schedule and on budget.

Implementation for "Proof of Concepts"

NCDOT will set an initial scope, schedule, and budget estimate for each project authorized, consistent with the funding assumptions. The project schedule and budget usually span multiple biennia. NCDOT will assign staff project management responsibility for completing projects within the scope, schedule and budget levels. NCDOT will establish a project budget consistent with the external funding decision, but the estimate for the cost of delivering the budget is refined with greater precision during the course of the project. When project engineers determine an adjustment to the project's scope, schedule or budget is warranted, a predetermined "change-control process" should be utilized to authorize adjustments.

The following will provide initial direction for all identified Project Executives and/or Project Managers. Project Delivery for each "Proof of Concept" will be evaluated by the establishment of a definitive set of metrics that will be utilized to measure, manage and monitor the most effective Project Delivery models.

- ***Formal Notification and assignment of Project Executives, Formal Team Members and/or Tri-Technical Managers*** :

Letter for the Project Executives:

Memorandum to:
FROM:
Date:
SUBJECT: DOT Project Executive

On the subject project, we will begin utilizing a Project Executive management approach to advance it through the project development process. You have been selected to be the DOT Project Executive for the above project. As the DOT Project Executive, you will be responsible for the overall management of the project. You will also guide the project to ensure that the major project activities of planning, design, right of way acquisition, permitting and construction are completed successfully and according to schedule. The DOT Project Executive will coordinate very closely with the other technical managers as they guide the project through the project development process. They will work closely with others to resolve any technical issues and obtain concurrence on all aspects of the project development from inception to completion.

The DOT Project Executive will coordinate and monitor all project development components by:

- Ensuring effective management of project scope, schedule and budget
- Setting delivery dates for work products to achieve the established Draft TIP dates.
- Establishing cost estimates for preliminary engineering and construction
- Recognizing and resolving conflicts
- Providing solutions to workload issues, goals and objectives

Please begin coordinating on this project immediately and provide the following information to the TMT Leadership Team by Date:

- A detailed project schedule of major work activities that need to occur to achieve the current Draft TIP dates of FY 11 R/W and FY 13 on project segment B and FY 12 R/W for project segment C.
- A Preliminary Engineering cost estimate that includes all aspects from Planning, Design, Permitting and Construction
- Quarterly Status Report Meeting minutes
- An up-to date Project StaRS report

The DOT Project Executive management concept is being piloted on this project to measure its effectiveness as a management method for project delivery. I am asking that everyone fully cooperate with (Project Executive) as (he or she) begins to manage the project. We will be scheduling an informational meeting soon to provide additional information regarding this management concept as well as others that are being piloted. If you have any comments or questions in the mean time, please contact (designated person).

Letter for the Project Executive with a formal team:

MEMORANDUM TO:
FROM:
Date:
SUBJECT: DOT Project Executive with Formal Team

On the subject project, we will pilot a management approach that will utilize a DOT Project Executive that will be assisted by a Formal Project Team. You have been selected to be a member of the Formal Project Team that will assist the DOT Project Executive for the above project. The DOT Project Executive will be responsible for internal coordination and communication across all the disciplines. The DOT Project Executive will also be responsible for working with the project team members and guiding the team so all project milestones can be achieved on schedule and on budget. Also, for more information regarding this and other pilot management concepts, please refer to the attached information.

The DOT Project Executive and the Formal Team will coordinate and monitor all project development components by:

- Ensuring effective management of project scope, schedule and budget
- Setting delivery dates for work products to achieve the established Draft TIP dates.
- Establishing cost estimates for preliminary engineering and construction
- Recognizing and resolving conflicts
- Providing solutions to workload issues, goals and objectives

Please begin coordinating on this project immediately and provide the following information to the TMT Leadership Team by DATE:

- A detailed project schedule for major work activities that need to occur to achieve the current Draft TIP schedule of FY 09 letting (Draft TIP Schedule is based on utilizing Design-Build as the contracting method).
- An extended project team member list that includes all the technical managers that will be responsible for completing work on the subject project.
- A Preliminary Engineering cost estimate that includes all aspects from Planning, Design, Permitting and Construction
- Quarterly Status Report Meeting minutes
- An up-to date Project StaRS report

The DOT Project Executive with a Formal Project Team is being piloted to measure its effectiveness as a management method for project delivery. I am asking that everyone work cooperatively with the DOT Project Executive and the Project Team Members as this project continues to advance. We will be holding an informational meeting soon to provide more information regarding this management approach. If you have any comments or questions, please contact NAME.

Letter for the Tri-Technical Managers:

Memorandum to:
FROM:
Date:
SUBJECT: Tri-Technical Managers

On the subject project, we will begin utilizing a Tri-Technical manager approach as this project continues to advance through the project development process. The three of you have been selected to jointly lead and manage the project. The Tri-Technical Managers will also be responsible for delivery of the project and coordinating with others to ensure major project activities, which includes planning, design, right of way acquisition, permitting & construction are successfully completed. As Tri-Technical managers, you will also maintain close communication, collaboration, and coordination among yourselves as you guide the project from its current stage through construction completion. Also, for more information regarding this and other pilot management concepts, please refer to the attached information.

The Tri-Technical Managers will coordinate and monitor all project development components by:

- Ensuring effective management of project scope, schedule and budget
- Negotiating work items and schedules that achieve the provided Project Letting Date
- Establishing cost estimates for preliminary engineering and construction
- Recognizing and resolving conflicts
- Providing solutions to conflicting project priorities, goals and objectives

Please begin coordinating on this project immediately and provide the following information to the TMT Leadership Team by DATE:

- A detailed project schedule of major work activities that need to occur to achieve the current Draft TIP dates of FY 2009 R/W and a FY 2010 letting
- A detailed Project Team Member list that includes the other technical managers that will be responsible for completing work on the subject project. Jointly prepare and administer PE budget.
- Produce Quarterly Status Reports with up to date Project StaRS Report

The Tri-Technical Management concept is being piloted on this project to measure its effectiveness as a management method for project delivery. I am asking that everyone work cooperatively with the Tri-Technical Managers as this project continues to advance. We will be holding an informational meeting soon to provide more information regarding this management approach. If you have any comments or questions in the mean time, please contact NAME.

Definition of Responsibilities for each Proof of Concept Model

Project Executive (PE) Responsibilities:

- Serves as the main contact for project related information as the project proceeds through the development phase. The Project Executive is responsible for all activities necessary to ensure that assigned projects are moved successfully through the Project Development process.
- Prepares and administers the PE budgets.
- Is directly responsible and accountable to the Director of Preconstruction and Division Engineer for scope, schedule and budget management of all assigned projects. However, not staffed directly to either position.
- Identifies work that must be done in order to deliver a product that meets scope, schedule and budget.
- Maintains documentation/history during the project's life that reflects accountability and transparency for all project decisions that can be reviewed for lessons learned at a later date.
- Involves internal and External stakeholders.
- Provides and is responsible for internal coordination and communication across all disciplines.
- Manages project development activities performed by various project development staff.
- Monitors performance.
- Provides overall strategy and direction for the project.
- Recommends protocols, solutions, and applications of standards or proper courses of action.
- Negotiates work items and schedules.
- Establishes cost estimates for preliminary engineering and construction.
- Recognizes and resolves conflicts.
- Provides solutions to workload issues, goals and objectives.
- Negotiates among stakeholders with different outcome expectations.

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Formal Team (Core and Extended) Responsibilities:

The formal team will consist of a representative from each technical discipline that is involved in project development. They will collaborate with the Project Executive. The core team will identify and involve extended team members and their activities. Each team member:

- Provides input for their respective discipline to assist in determining project scope.
- Provides schedule input for their portion of work
- Advises of any unique or special elements that may need to be incorporated into the project.
- Identifies any required agreements and designate the responsible team member.
- Provides technical advice and consultation for the associated discipline.
- Develops and maintain cooperative work relationships with other Team members
- Delivers and is responsible for providing technical products/services on time and within budget. Ensures standards, practices and procedures are followed or appropriate exceptions are obtained.
- Solves technical problems in a manner that meets the needs of the customer and the agency.
- Maintains documentation/history during the project's life that reflects accountability and transparency for all project decisions for their respective discipline.

Tri-Technical Managers' Responsibilities:

- Collaborate and communicates on all aspects of the project from inception through construction.
- Jointly manages and ensures all technical aspects of the project are included and completed to obtain all milestones on schedule and on budget.
- Jointly prepares and administers the PE budgets.
- Ensures that appropriate communication and collaboration are maintained throughout the development of the project.
- Obtains input for each respective discipline to determine project scope.
- Develops schedule for all work to be completed based on the Draft T.I.P schedule for Right of Way and Let Dates.
- Regularly monitors and documents progress of project.
- Determines need for and make recommendations for changes in scope, schedule and budget.
- Makes technical decisions
- Reviews and accepts work.
- Maintains documentation/history during the project's life that reflects accountability and transparency for all project decisions.
- Advises of any unique or special elements that may need to be incorporated into the project.
- Develops and maintains cooperative work relationships with other Team members.

Performance Measures for Pilot Project Management Concepts

Adherence to Schedule

Measurement:
Activities/Milestones/Products planned to begin/complete during one-year cycle versus
Actual activities begun/completed

Adherence to Cost

Measurement:
Planned PE Expenditures during one-year period to actual expenditures

Measurement:
Construction cost estimate at beginning of year compared to construction cost estimate at end of year

Measurement:
Scope of project at beginning of one-year to scope of project at end of year

Overall Rating of Pilot Management Concepts: Use the following questionnaire to obtain comments and provide feedback for management's evaluation of concepts.

This questionnaire would be completed by Project Executive/Team Members, any unit representative that worked on a pilot project during one-year period, immediate supervisor of project team member, associated Unit Heads, Branch Manager, Division Engineer & Director.

Questionnaire for Pilot Management Concepts

All questions will be based on the following:
Strongly Disagree Disagree Agree Strongly Agree

1. An action plan was developed to resolve issues when they arose.
   Strongly Disagree Disagree Agree Strongly Agree

2. Issues were handled in a timely manner.
   Strongly Disagree Disagree Agree Strongly Agree

3. My technical comments were considered in the decision.
   Strongly Disagree Disagree Agree Strongly Agree

4. I had a good understanding of the project status at all times.
   Strongly Disagree Disagree Agree Strongly Agree

5. Within my work area, I gave this project priority over others assigned.
   Strongly Disagree Disagree Agree Strongly Agree

6. This project has made me more aware of project budget.
   Strongly Disagree Disagree Agree Strongly Agree

7. I have had more accountability in delivery regarding this project.
   Strongly Disagree Disagree Agree Strongly Agree

8. StaRS activities have been kept up to date on this project.
   Strongly Disagree Disagree Agree Strongly Agree

9. I observed good communication lines with all parties involved in the project.
   Strongly Disagree Disagree Agree Strongly Agree

10. From my observation, I believe this management concept will help to result in a Quality project.
    Strongly Disagree Disagree Agree Strongly Agree

11. I recommend this concept be expanded and used on more TIP projects.
    Strongly Disagree Disagree Agree Strongly Agree

12. On a scale of 1 to 10 with one being low and 10 being high, rate this concept as it relates to schedule, cost, budget, accountability, ease of doing your job and moving the project quickly.
    Strongly Disagree Disagree Agree Strongly Agree

Summary

As we reviewed and studied the McKinsey Diagnostic and previous reports about the NCDOT, received stakeholder input , and contacted various peer DOT's, we have attempted to identify similar threads of functional issues. The following is a brief overview of what we have identified as it relates to the four functional issues identified in the McKinsey diagnostic:

1) Coordination among business units:
   There is no sense of urgency to identify priorities for the Transportation Improvement Program. The comment often repeated is that major corporations can not operate successfully with undefined priorities. Once priorities are communicated across DOT we can begin to align the resources outside and inside our organization to see an immediate increase in efficiency. To recognize an additional increase in efficiency one of our recommendations is to create a Project Streamlining Committee. Their task will be to review and recommend streamlining initiatives with an objective of reducing delivery time across all project phases.
   To assist with workload distribution we recommend establishment of a process where Divisions can partner with Preconstruction on development of T.I.P. Projects that only require a PCE or CE. A local right of way utility position in each division would also improve efficiency among business units by encouraging team building relationships with local utility companies and bringing to each division an expert resource for utility issues.

2) Project Accountability:
   Currently project accountability is not perceived as a shared responsibility. There is no common thread across all project delivery phases. Project delivery is defined as all activities from scoping to ribbon cutting. A group of strategic projects have been identified to implement "Proof of Concept" models on. Each model shall have a formally chartered Project Executive or Tri-Project Managers that will be accountable and responsible for scope, schedule, budget and quality metrics. The expectation of formally establishing key project personnel for each model is to tighten cost containment, schedule metrics and enhance overall delivery time. The models will also aid in improving "Coordination among business units" by use of a Division representative as a member of the Tri-Project Manager Team. The Tri-Project Manager Team is recommended to immediately become the standard operating procedure for all T.I.P projects.

   To assist/enable all of NCDOT's staff to enforce accountability we recommend the establishment of an Office of Program/Project Delivery to own the overall Policies, Procedures, Standards and other delivery support mechanisms. This office will standardize policies, procedures and communication for all stages of project development across departmental boundaries. They will also be tasked with developing a scope to construction project development manual. The manual will focus on establishing standardized business rules for project delivery, and clearly conveying roles and responsibilities. The manual will be an excellent resource for future engineers and managers. This office will serve as a process bridge between Operations and Preconstruction.

3) Coordination across geographic regions:
   To improve communication flow across all organizational units and support work flow, regional realignment of design personnel with the PD&EA regions and Divisions would better facilitate team work and remove functional walls. This will facilitate regional information exchanges on a regular basis. It will also be a venue that leads to timely constructability reviews and the utilization of value engineering for major strategic projects at appropriate project development stages. Their exchanges will add value by the simple fact of working with the same Teams on a routine and regular basis. These type of meetings will be instrumental in calibrating operations and preconstruction resources for project and program delivery and will be another means to gauge success of our collective efforts.

4) Bureaucracy:
   Creation of an informal two tier T.I.P. with one part Developmental and one part Delivery will enhance priorities for work activities for preconstruction and operations. It will also unilaterally coordinate work across all department business units by establishing and publishing strategic priorities. This will solidify a staff commitment to ensure long-term process owners. It will clearly demonstrate that our Departments priorities are aligned with all stakeholders. It will demonstrate the Department has full support outside our walls!

In Closing

Our Department recognizes the challenges of our task to continually seek methods to improve Project Delivery while delivering a large capital program and maintaining our responsiveness to all stakeholder needs. All 2,040 funded T.I.P projects should not and cannot be equal in importance. This is not a successful business model.

Strategic projects and programs that add the maximum return on investment to our transportation system must be recognized and published for staff and all stakeholders. Outputs of the pilot program management concepts should be monitored, documented and published to gauge success. It would then be recommended that we implement project management concepts that prove to be successful on the pilot strategic high value projects throughout the organization.